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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,493	01/30/2006	Donald Henry Willis	PU030229	6164

24498 7590 11/24/2008

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EXAMINER	
CERULLO, LILIANA P	
ART UNIT	PAPER NUMBER
2629	
MAIL DATE	DELIVERY MODE
11/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,493	WILLIS, DONALD HENRY	
	Examiner	Art Unit	
	LILIANA CERULLO	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/30/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim1 is objected to because of the following informalities: Claim 1 Line 10 recites "when the at least pixel", but it should read "when the at least one pixel". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1, 2, 6, 7, 11, 15, 16 and 20** are rejected under 35 U.S.C. 102(e) as being anticipated by Morgan in US 6,567,134 (hereinafter Morgan).

4. Regarding **claim 1**, Morgan teaches a method for operating a sequential color display system (col. 1 lines 27-29) including a color changer and an imager (col. 3 lines 3-5 where the color changer is a sequential color light source, and an imager is the spatial light modulator), which operate in combination to sequentially illuminate at least one pixel with each of a set primary colors (col. 5 lines 36-42 explains using RGB for each pixel, and col. 1 lines 27-29), comprising the steps of:

applying a control signal (col. 9 lines 43-46) to the imager (DMD) to cause the imager to illuminate the at least one pixel for each primary color at a brightness level in accordance with the control signal (col. 10 lines 54-61 and col. 5 lines 33-42 teaching the data to be intensity values);

using light occurring during at least one first spoke (col. 5 lines 64-67), corresponding to a first interval when the color changer transitions from one color to another (col. 4 lines 9-12), when the at least one pixel has a brightness level above a first prescribed threshold for at least one color (col. 7 lines 21-30 teach using the spoke light only for relatively bright images, thus requiring the use of a threshold to determine when an image is relatively bright and turn-on the spoke light); and

altering the control signal when the light is used during such spoke to decrease brightness of at the least one color (col. 7 lines 7-20 and 43-53 where the intensity for red and green is decreased [subtracted value] when enabling the first spoke) in substantial time proximity to the occurrence of the spoke (col. 7 lines 10-20 where the intensity data is reduced so there will be one LSB increase when the spoke light is turned on, and then gradually added until the next spoke, therefore teaching the adjustment of brightness occurring close to the time when the spoke light will be turned on) to compensate for the brightness increase caused by using the light during such spoke (col. 7 lines 7-10 where the method is used for reducing artifacts, and col. 6 lines 27-30 where artifacts are generated by color boost from using spoke lights).

5. Regarding **claim 7**, a method for operating a sequential pulse width modulated display system (DMD of Fig. 5) having a color changer and an imager (col. 3 lines 3-5 where the color changer is a sequential color light source, and an imager is the spatial light modulator) that operate in combination to sequentially illuminate at least one pixel for each of a set of primary colors (col. 5 lines 36-42 explains using RGB for each pixel, and col. 1 lines 27-29), comprising the steps of:

applying a plurality of sequences of pulse width segments to the imager (RGB of color wheel of Figs. 1-2), each pulse width segment (RGB or spoke light on of col. 6 lines 4-9) causing the imager to illuminate the at least one pixel for each primary color at a brightness level in accordance with the actuation state of pulses within the pulse segment for said at least one pixel (col. 10 lines 54-67 and col. 5 lines 33-42);

using light occurring during at least one first spoke (col. 5 lines 64-67), corresponding to a first interval when the color changer transitions from one color to another(col. 4 lines 9-12), when said at least one pixel has a brightness for at least one color above a prescribed threshold (col. 7 lines 21-30 teach using the spoke light only for relatively bright images, thus requiring the use of a threshold to determine when an image is relatively bright and turn-on the spoke light); and

altering at least one sequence of pulse width segments when the light is used during the at least one first spoke to decrease brightness of at the least one color (col. 7 lines 7-20 and 43-53 where the intensity for red and green is decreased [subtracted value] when enabling the first spoke, and col. 10 lines 54-61 where the DMD waveform is generated based on RGB and spoke bit data, therefore teaching altering the

sequence of pulse width segments) in substantial time proximity to the occurrence of the at least one first spoke (col. 7 lines 10-20 where the intensity data is reduced so there will be one LSB increase when the spoke light is turned on, and then gradually added until the next spoke, therefore teaching the adjustment of brightness occurring close to the time when the spoke light will be turned on) to compensate for the brightness increase caused from using the light during the at least one first spoke (col. 7 lines 7-10 where the method is used for reducing artifacts, and col. 6 lines 27-30 where artifacts are generated by color boost from using spoke lights).

6. Regarding **claim 11**, a method for operating a sequential pulse width modulated display system (DMD of Fig. 5) having a color changer (color wheel of Figs. 1-2) which causes each of a set of primary colors (Figs. 1-2, RGB) to sequentially illuminate an imager (col. 3 lines 3-5) which lights up each of a plurality of pixels for each primary color (array of pixels of col. 6 lines 12-16), comprising the steps of:

applying a plurality of sequences of pulse width segments to the imager (RGB of color wheel of Figs. 1-2), each pulse width segment (RGB or spoke light on of col. 6 lines 4-9) causing the imager to illuminate each pixel for each primary color at a brightness level in accordance with the actuation state of pulses for each pixel within the pulse segment (col. 10 lines 54-67 and col. 5 lines 33-42);

choosing at least one first spoke (col. 5 lines 64-67, where one individual spoke can be chosen to boost the intensity of secondary colors), corresponding to a first

interval when the color changer transitions from one primary color to another primary color (col. 4 lines 9-12);

altering at least one sequence of pulse width segments (col. 7 lines 7-20 and 43-53 where the intensity for red and green is decreased [subtracted value] when enabling the first spoke, and col. 10 lines 54-61 where the DMD waveform is generated based on RGB and spoke bit data, therefore teaching altering the sequence of pulse width segments) above a prescribed pixel brightness level (col. 7 lines 21-30 teach using the spoke light only for relatively bright images, thus requiring the use of a threshold to determine when an image is relatively bright and turn-on the spoke light) for at least one color to selectively increase pixel brightness by using light during the at least one first spoke (col. 5 lines 64-67) and to decrease pixel brightness during the pulse width segments occurring substantially immediately before and after the at least one first spoke (col. 7 lines 10-20 where the intensity data is reduced so there will be one LSB increase when the spoke light is turned on, and then gradually added until the next spoke, therefore teaching the adjustment of brightness occurring before and after the spoke light is turned on) in order to compensate for the brightness increase from the spoke light (col. 7 lines 7-10 where the method is used for reducing artifacts, and col. 6 lines 27-30 where artifacts are generated by color boost from using spoke lights).

7. Regarding **claim 15**, a sequential color display system, comprising:

a light source (Fig. 6 and col. 6 lines 62-65, light source 604);

an imager (Fig. 6, DMD) for directing light from the light source to selectively illuminate each of a plurality of pixels on a display screen (col. 11 lines 8-10);

a color changer (color wheel of Figs. 1-2) for sequentially changing the color of the light illuminating each of the plurality of pixels (array of pixels of col. 6 lines 12-16), and

a controller (Fig. 6 and col. 11 lines 2-4, controller 614) for

(a) applying a control signal to the imager to cause the imager to illuminate an associated pixel (col. 11 lines 2-4) for each primary color at a brightness level in accordance with the control signal (col. 10 lines 54-61, primary colors are RGB, mirror on-time weights control brightness level for DMDs);

(b) using light occurring during at least one first interval (col. 5 lines 64-67, where the first interval is a spoke light) in which the color changer transitions from one color to another (col. 4 lines 9-12) when at least one color has a brightness level above a first prescribed threshold (col. 7 lines 21-30 teach using the spoke light only for relatively bright images, thus requiring the use of a threshold to determine when an image is relatively bright and turn-on the spoke light); and

(c) altering the control signal when the light is used during the at least one first spoke to decrease the brightness of at least one primary color (col. 7 lines 7-20 and 43-53 where the intensity for red and green is decreased [subtracted value] when enabling the first spoke) in substantial time proximity to the occurrence of the at least one first spoke (col. 7 lines 10-20 where the intensity data is reduced so there will be one LSB increase when the spoke light is turned on, and then gradually added until the next

spoke, therefore teaching the adjustment of brightness occurring close to the time when the spoke light will be turned on) to compensate for the brightness increase caused from using the light during said at least one first spoke (col. 7 lines 7-10 where the method is used for reducing artifacts, and col. 6 lines 27-30 where artifacts are generated by color boost from using spoke lights).

8. Regarding **claims 2 and 16**, Morgan teaches the step of altering the control signal comprises the step of altering the control signal to decrease the brightness immediately before and after such spoke (col. 7 lines 7-10 where the intensity is reduced before the spoke light is on, and gradually adding the primary color data after the spoke period; therefore teaching that after the immediately after the spoke light is on, the primary color data is still reduced).

9. Regarding **claims 6 and 20**, Morgan teaches the step of applying the control signal includes applying a plurality of sequences of pulse width segments (RGB of Figs. 1-2), each pulse width segment (RGB or spoke light on of col. 6 lines 4-9) causing the imager to illuminate an associated pixel for each primary color at a brightness level in accordance with a total actuation of pulses within the pulse segment for such associated pixel (col. 10 lines 54-67 referring to the DMD [imager] illuminating an associated pixel, col. 5 lines 33-42 referring to each primary color contributing to the pixel intensity value, and col. 7 lines 48-50 where the spoke period is lit in alternate period to obtain the desired first yellow component of Table 1).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. **Claims 3-5, 8-10, 12-14 and 17-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Morgan in US 6,567,134.

12. Regarding **claims 4, 9, 13 and 18**, Morgan teaches the step of using light occurring during at least one additional spoke (Table 2 referring to Magenta spoke), in addition to the light used during the at least one first spoke (Table 1 referring to Yellow spoke), but fails to explicitly teach a second threshold.

However, in the disclosure, Morgan also explains that perceived intensity by the human eye varies for each color (col. 5 lines 48-54) and that a threshold can be used to turn on the spoke light only for bright colors (Soff of col.9 lines 15-37); furthermore, Morgan discloses both Yellow and Magenta spokes using the primary red color (Tables 1-2). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have a different threshold for each color, yellow and magenta, given that brightness is perceived differently for each color by the human eye (as taught by Morgan), and doing so would provide the viewer with a better compensation for unequal color intensities (as taught by Morgan in col. 5 lines 5—55). Consequently, by having a

different brightness threshold for yellow and magenta, each of the primary colors, for example red, could have a different brightness threshold during each of the two spokes.

13. Regarding **claims 3, 5, 8, 10 12, 14, 17 and 19**, Morgan fails to explicitly teach different brightness thresholds for each color. However, Morgan does teach that perceived intensity by the human eye varies for each color (col. 5 lines 48-54) and that a threshold can be used to turn on the spoke light only for bright colors (Soff of col.9 lines 15-37).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use a different brightness threshold for each color, given that each color brightness is perceived differently by the human eye (as taught by Morgan), and doing so would provide the viewer with a better compensation for unequal color intensities (as taught by Morgan in col. 5 lines 5—55).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,445,505 discloses a method for using spoke lights.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LILIANA CERULLO whose telephone number is (571)270-5882. The examiner can normally be reached on Monday to Thursday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LC

/Amr Awad/

Supervisory Patent Examiner, Art Unit 2629